

**5.16.03 MATERIAL PASSING NO. 200 (75 µm) SIEVE BY THE WASH METHOD (Kansas Test Method KT-3)**

**a. SCOPE**

This method of test covers the procedure for determining the quantity of material finer than the 75 µm(No. 200) sieve in aggregate by the wash method. It should be recognized that this procedure will not determine the total amount of material finer than the No.200 (75 µm) sieve and that the total amount must be determined by a combination of washing, drying and re-screening as outlined in **KT-2**. KT-3 reflects testing procedures found in AASHTO T 11.

**b. REFERENCED DOCUMENTS**

**b.1.** KT-2; Sieve Analysis of Aggregates

**b.2.** KT-7; Clay Lumps in Aggregate

**b.3.** AASHTO M 92; Wire-Cloth Sieves for Testing Purposes

**b.4.** AASHTO T 11; Materials Finer Than No.200 (75 µm) Sieve in Mineral Aggregates by Washing

**c. APPARATUS**

**c.1.** A nest of two sieves, the lower being a No.200 (75 µm) sieve and the upper being a sieve with openings in the range of No. 8 (2.36 mm) to No. 16 (1.18 mm), both conforming to the requirement of AASHTO M 92.

**c.2.** A pan or vessel of a size sufficient to contain the sample covered with water and to permit vigorous agitation without loss of any part of the sample or water.

**c.3.** Drying pans.

**c.4.** The balance shall conform to the requirements of AASHTO M 231 for the class of general purpose balance required for the principal sample mass of the sample being tested.

**c.5.** Oven capable of maintaining uniform temperature of 230 + 9°F (110 + 5°C).

NOTE 1: The use of a mechanical apparatus to perform the washing operation is not precluded, provided the results are consistent with those obtained using manual operations. The use of some mechanical washing equipment with some samples may cause degradation of the sample.

**d. TEST SAMPLE**

Select the test sample from material that has been thoroughly mixed. Except for plant dried aggregate, the material from which the sample is selected should contain sufficient moisture to prevent segregation. Select a representative sample of sufficient size to yield not less than the mass of dried material shown in Table **5.16.03-1**.

TABLE 5.16.03-1  
Sample Size for Determination of Percent of Material  
Passing No.200 (75 µm) Sieve by washing

*Sieve Size	Minimum Mass of Samples (g)
1 1/2 in (37.5 mm) or more.....	5,000
3/4 in (19.0 mm).....	2,500
3/8 in (9.5 mm).....	1,000
No. 4 (4.75 mm) or less.....	300

NOTE \*: To select the sample size, use the largest sieve on which 5 percent or more of material is specified to be retained.

NOTE 2: Monitor test samples for clay lumps. The percent of clay lumps permitted in these aggregates is covered by a separate specification for the following materials and the method of determination is covered by **KT-7**:

- Concrete (Except lightweight aggregate).
- Underdrain.
- Cover Material.
- Subgrade Modification or Reconstruction.
- Surfacing or Resurfacing.
- Surfacing or Subgrade Modification for Secondary Roads.
- Crushed Stone for Backfill.

#### **e. TEST PROCEDURE**

**e.1.** Dry the sample to constant mass at a temperature of 230 + 9°F (110 + 5°C). Determine the mass of the sample to the nearest 0.1 percent. Record this as the original dry mass.

**e.2.** Place the dry, weighed sample in a container and cover with potable water containing a sufficient amount of wetting agent to assure thorough separation of the material finer than the No.200 (75 µm) sieve from the coarser particles. Agitate the contents of the container vigorously and immediately pour the wash water over the nested No. 16 and No. 200 (1.18 mm and 75 µm) sieves, arranged with the coarser sieve on top. The use of a large spoon to stir and agitate the wash water is helpful.

**e.3.** The agitation shall be sufficiently vigorous to result in the complete separation of the particles finer than the No.200 (75 µm) sieve from the coarser particles, and to bring the fine material into suspension so it will be removed by decantation of the wash water. Agitation should not be so vigorous that an excess amount of coarse particles is decanted on to the No.200 (75 µm) sieve. Repeat the operation until the wash water is clear.

NOTE 3: If mechanical wash equipment is used, the charging of water, agitating, and decanting may be a continuous operation.

**e.4.** Dry all material retained to constant mass at a temperature of approximately 230 + 9°F (110 + 5°C). Weigh the sample to the nearest 0.1 percent. Record this as the final dry mass.

#### **f. CALCULATIONS**

Calculate the results by use of the following formula:

$$P = \frac{100(\text{ODM}-\text{FDM})}{\text{ODM}}$$

Where: P = Percent of material finer than No.200 (75 µm).

ODM = Original Dry Mass.

FDM = Final Dry Mass (after washing).

#### **g. CHECK DETERMINATIONS**

When check determinations are desired either evaporate the wash water to dryness or filter it through tared filter paper which shall subsequently be dried and the residue weighed. Calculate the percentage by use of the following formula:

$$P = \frac{100(\text{MR})}{\text{ODM}}$$

Where: P = Percent of material finer than No.200 (75 µm).

MR = Mass of Residue.

ODM = Original Dry Mass.

#### **h. REPORT**

Report the percentage of material finer than the No.200 (75 µm) sieve by washing to the nearest 0.1 percent, except if the result is 10 percent or more, report the percentage to the nearest whole number.

#### **i. PRECISION**

The estimates for precision of this test method are based on the results from the AASHTO Materials Reference Laboratory Proficiency Sample Program and are presented in Table **5.16.03-2**.

**Table 5.16.03-2**

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	Standard Deviation (1S), Percent	Acceptable Range of Two Results (D2S), Percent
Coarse aggregate:		
Single operator precision	0.10	0.28
Multilaboratory precision	0.22	0.62
Fine aggregate:		
Single operator precision	0.15	0.43
Multilaboratory precision	0.29	0.82